

inactivity. The communication device may comprise a device operating under a digital subscriber line standard. The sequence signal may comprise a sequence signal based on an M-sequence.

One method of operation determines whether to initiate a warm start operation or  
5 a cold start operation for one or more communication devices. An example of this method comprises generating a sequence signal at a first device and transmitting the sequence signal to a second device. At the second device, receiving the sequence signal at the second device and correlating the sequence signal at the second device. After correlating, analyzing the correlated signal at the second device to determine current  
10 channel characteristics. The method then compares the current channel characteristics to at least one prior channel characteristic and then selects between a warm start operation and a cold start operation based on the comparison.

Variations to this example method may further include transmitting a sequence signal to the first device from the second device. The adjusting may include adjusting  
15 at least one setting of the second device based on the analyzing. In one embodiment selecting comprises selecting a warm start operation if the comparing reveals the channel characteristics have not changed beyond a threshold level and selecting a cold start operation if the comparing reveals the channel characteristics have changed beyond a threshold level. The cold start operation may take a longer period of time to complete  
20 than the warm start operation.

Other systems, methods, features and advantages of the invention will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be included within this description, be within the scope of the invention,  
5 and be protected by the accompanying claims.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. In the figures, like reference  
10 numerals designate corresponding parts throughout the different views.

Figure 1 is a block diagram of an example environment of use of the invention.

Figure 2 is a block diagram of an example embodiment of a system configured with one embodiment of the invention.

Figure 3 illustrates a more detailed block diagram of an example embodiment of the  
15 transmitter shown in Figure 2.

Figure 4 illustrates a block diagram of an example embodiment of a sequence generator configured using a linear feedback shift register or scrambler type implementation.

Figure 5 illustrates an alternative embodiment of a sequence generator.

Figure 6A illustrates a block diagram of an example embodiment of a receiver.

20 Figure 6B illustrates a block diagram of an alternative embodiment of a receiver.

Figure 7 illustrates block diagram of a correlation unit configured to correlate a received signal with a signal  $C(n)$ .

Figure 8A and 8B illustrate example plots of a sequence signal and the effect of correlation with regard to noise.

5        Figure 9 illustrates a plot of frequency components of a periodic sequence on a graph of frequency and spectral amplitude.

Figure 10 illustrates an exemplary timing diagram of an example pattern of wake-up signal communication between a central office communication device and customer premise equipment.

10        Figure 11 illustrates a state diagram for an example sequence of wake-up for a communication system.

Figure 12 illustrates an operational flow diagram of an example method of sequence generation.

15        Figure 13 illustrates an operational flow diagram of an alternative method of sequence generation such as might be implemented for use with a table look-up method.

Figure 14 illustrates an operational flow diagram of an example method of operation of one embodiment of the invention.

Figure 15 illustrates an operational flow diagram of an alternative method of operation implementing channel analysis as part of the wake-up signal process.

20        Figure 16 illustrates an operational flow diagram of an alternative method of operation channel analysis on a period.